Rasool Basha Sk* et al.
(IJITR) INTERNATIONAL JOURNAL OF INNOVATIVE TECHNOLOGY AND RESEARCH
Volume No.4, Issue No.6, October – November 2016, 4943-4945.

Saving The Life Of The Fuel Cell Using Green Energy System

RASOOL BASHA.SK
M.Tech Student, Dept of EEE
Vidya Jyothi Institute of Engineering & Technology
Ongole, A.P, India

S.AVINASH KUMAR
Associate Professor, Dept of EEE
Vidya Jyothi Institute of Engineering & Technology
Ongole, A.P, India

Abstract: **An over-all power system uses battery energy storage to prevent an electrical outage or harmful electrical currents brought on by natural ecological factors. Alternative energy is changed into electricity and buffered with energy storage elements, and then it's inverted to ac and given in to the utility grid. This method can readily adjust to existing electrical facilities and expedite utilization of alternative energy. This paper is definitely the design and implementation of the energy management system (EMS) with fuzzy control for any electricity microgrid system. Modeling, analysis, and charge of distributed power sources and storage devices with MATLAB/Simulink are suggested, and also the integrated monitoring EMS is implemented with Lab VIEW. The RS-485/ZigBee network continues to be made to control the operating mode and also to monitor the of subsystems within the electricity microgrid system. To enhance the existence cycle from the battery, fuzzy control manages the preferred condition of charge.**

Keywords: **Energy Management System (EMS); Fuzzy Control; Microgrid;**

I. INTRODUCTION

Current eco-friendly energy utilized in power generation includes: solar, wind, geothermal power, biomass, and tidal. Many countries have set an objective of growing using alternative energy above 20% of the total power consumption through the year 2020. An over-all power system uses battery energy storage to prevent an electrical outage or harmful electrical currents brought on by natural ecological factors. Alternative energy is changed into electricity and buffered with energy storage elements, and then it's inverted to ac and given in to the utility grid. This method can readily adjust to existing electrical facilities and expedite utilization of alternative energy. However, existing high quality little appliances and equipment are operated by electricity, that is converted by rectifying an ac source with power actor correction [1]. To make use of alternative energy more proficiently, electricity ought to be directly provided to those loads. This type of supply plan is way not the same as those of the traditional ac distribution and offer system. There are many research groups, that have extended our prime current (380 V) electricity-distribution system they are driving kitchen appliances, which the elegant power application research center (EPARC) has generated an exhibition house for testing the general system operation. Within this paper, the machine configuration including eco-friendly turbine, energy storage element, electricity appliance and equipment, and management system (EMS) having a fuzzy controller is going to be introduced. In the introduction of the eco-friendly energy systems, a control technique is needed to optimize energy distribution of the microgrid system. Therefore, model construction is essential for solar power, wind power, and storage devices, for example lithium-ion batteries, to simulate dynamic changes from the alternative energy for optimal energy distribution [2]. The suggested EMS was commanded with RS-485/ZigBee network for data communication and delivery of one's distribution instructions. The look idea of this research ended up being to boost the helpful existence of lithium batteries and also to include charge and also over discharge protection mechanisms. The ability generator typically includes Solar panels, wind generators, and fuel cells. The fuel cells provide base power for that emergency loads once the product is operated throughout a power failure. Maximum power point trackers are connected with Solar panels and wind generators to attract maximum power that is given in to the electricity grid. If there's an electrical failure, the Li-ion battery is going to be first discharged to provide power for any short-time interval and when the failure lasts longer, the fuel cell will begin offering power. If there's residual turn on the electricity grid, battery could be billed based on its status, and/or even the bidirectional inverter could be operated in grid-connection mode to market power and regulate electricity-grid current. The suggested fuzzy control would be to optimize energy distribution and to setup battery condition of charge (SOC) parameters. The control formula takes the priority of promoting electricity because the premise of one's distribution to permit remaining power generated through the alternative energy from the electrical grid offered with the connected mains grid.

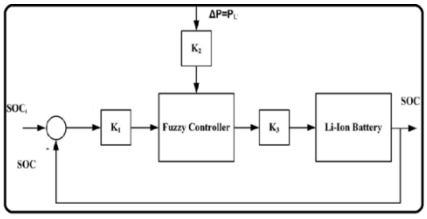

Fig.1.Proposed system model

II. SYSTEM MODELING

The modeling of electricity microgrid distributed energy and storage components was mainly built by MATLAB semolina mathematical modules, according to equivalent circuits from the components. This research used Sharp NUS0E3E solar modules, each having a power rating of 180 W, because the photovoltaic device from the microgrid system. This research used a solar 5 kW power system, generated by two photovoltaic arrays in parallel, where each array was constructed with 14 solar power panels in series [3]. The wind generator utilized in this studywasAWV-1500 of Gallant Precision Machining Company, Limited. Wind speed is easily the most critical element in residential wind power generation. Battery current is simple to determine and implement within the circuit. In the simulated results, we are able to begin to see the nonlinearity between current and SOC from the Li-ion battery. Therefore, the SOC parameter of batteries continues to be selected because the design factor rather of battery current within this paper. Fuel cells give a high quality clean option to today's power generation technologies. The polymer electrolyte membrane (PEM) fuel cell has acquired some acceptance in medium power commercial applications for example creating backup power; grid tied distributed generation, and electric vehicles. To create a precise controller from the suggested micro system, the dynamic mathematical types of the ability sources (PV, wind generator, and fuel cell), electricity/electricity converters (buck-boost, buck, and phase shifted full-bridge converters), bidirectional ripper tools (symmetrical full-bridge ripper tools), and bidirectional inverter (full bridge inverter) from the integrated micro-system are essential. However, the modeling, analysis, and style from the suggested integrated electricity micro system aren't simple [4]. To keep battery SOC with EMS, the fuzzy controller is required to meet design specifications, since the control for EMS is really a low response component and also the types of electricity/electricity converters, electricity/ac converters of themicro-dcmicrogrid system are unnecessary. Fuzzy control theory was created and implemented in EMS for that electricity microgrid system to offer the optimization from the system. The look qualifying criterion mandates that both photovoltaic tool and the wind generator are provided with a maximum power point tracker to keep the utmost operating point. The main difference between actual load and total generated power is taken into consideration for Li-ion battery in control and discharge modes. The existence cycle and SOC from the battery have been in direct proportion. To enhance the existence from the Li-ion battery, we are able to control and keep the SOC of battery with fuzzy control. A fuzzy control system is dependent on fuzzy-logic thinking in the style of the way a controller works. The so-known as fuzzy logic is defined a buffer zone between your traditional zero and something, with logic segments of none-zero and none-one possible. It enables a broader and much more flexible space in logic deduction for that expression of conceptual ideas and experience. A fuzzy controller is different from a conventional controller for the reason that it employs some qualitative rules based on semantic descriptions. To get the preferred SOC value, the fuzzy controller is made to maintain charging mode or discharging way of the suggested microgrid system. The output variable is NS rather of NB once the product is operated within the above conditions because selling electricity may be the first priority within this situation. Thus, the fuzzy control table from the suggested electricity microgrid product is not symmetrical. To increase the existence of storage batteries in the style of fuzzy control, the fuzzy control rules are going to maintain battery SOC. To manage technique of this research would be to sell electricity like a priority and also to maintain battery SOC. However, the SOC from the battery isn't the first priority to offer the safety once the inverter has ended the ability rating. The suggested fuzzy EMS using Lab VIEW graphic software was developed to manage and monitor the suggested electricity microgrid system [5]. The communication interface for every subsystem includes wireless ZigBee and RS-485. The machine converted the signals into monitoring data for display and database documentation in realization of the intelligent EMS. The power management system used RS-485 network topology for half-duplex network communication. The RS-485 network topology includes RS-232 and UART of every unit to create the communication interface. Furthermore, the ZigBee wireless communication was developed with XBee module.

III. CONCLUSION

In the simulation results, the machine achieves power equilibrium, and also the battery SOC maintains the preferred value for extension of battery existence using the control rules for any electricity microgrid. This paper is definitely the modeling, analysis, and style of fuzzy control to attain optimization of the energy management system for any electricity microgrid system. Furthermore, the optimization rules could be

incorporated within the intelligent microgrid management system, and also the system can conduct data communication and control operating status of subsystems through the RS-485/ZigBee network. The management system uses the look to manage microgrid with power equilibrium, and achieves optimal charge of the electricity microgrid system. The dynamic type of the suggested electricity microgrid system using MATLAB simulink is proven.

IV. REFERENCES

[1] L. Zhang, T. Wu, Y. Xing, K. Sun, and J. M. Gurrero, "Power control of DC microgrid using DC bus signaling," in Proc. Appl. Power Electron. Conf., 2011, pp. 1926–1932.

[2] Development of a DC Power Inlet Connector for 400 V DC IT Equipment, B. Davies, Director of Engineering, Anderson Power Products, Inc. Green Building Power Forum, Jan. 2010.

[3] M. B. Camara, B. Dakyo, and H. Gualous, "Polynomial control method of DC/DC converters for DC/DC converters for DC-Bus voltage and currents management-battery and supercapacitors," IEEE Trans. Power Electron., vol. 27, no. 3, pp. 1455–1467, Mar. 2012.

[4] Advantages of Low-Voltage DC Power in Commercial Building Interiors, B. Graham, President, Projects/Design & Construction Division of Johnson Control, Green Building Power Forum, Jan. 2010.

[5] M. F. Naguib and L. Lopes, "Harmonics reduction in current source converters using fuzzy logic," IEEE Trans. Power Electron., vol. 25, no. 1, pp. 158–167, Jan. 2010.

